

LISTING OF THE CLAIMS

This listing of claims replaces all prior versions and listings of claims in the application:

1. (Currently Amended) A wireless communication system comprising:

a mobile terminal;

a base station apparatus operable to communicate via a wireless communication line with the mobile terminal;

a data relay apparatus operable to communicate with the base station; and

a server apparatus,

wherein one of said mobile terminal, said base station apparatus, said data relay apparatus and said server apparatus includes:

a transmitting unit ~~which transmits a~~ operable to transmit transmission data and ~~receives an to receive~~ acknowledgement data corresponding to said transmission data through a communication line;

a monitoring unit ~~which monitors~~ operable to monitor said transmission data and said acknowledgement data;

a determining unit ~~which determines~~ operable to determine a retransmission timeout period based on a monitored result by said monitoring unit in a certain period; and

said transmitting unit ~~retransmits~~ is operable to retransmit said transmission data when said acknowledgement data is not received in within said retransmission timeout period,

wherein said monitoring unit is operable to monitor a round trip time and a data size (Dmin, Dmax, Dsize) of said transmission data, the round trip time being a time difference between a transmission time of the transmission data and a reception time of the acknowledgment data.

2. (Currently Amended) The wireless communication system according to claim 1, wherein said communication line includes a wireless communication line and ~~a~~ the wire communication line.

3. **(Original)** The wireless communication system according to claim 2, wherein said determining unit determines said retransmission timeout period based on said monitored result in a most recent certain period.

4. **(Canceled)**

5. **(Currently Amended)** The wireless communication system according to claim-4 1, wherein said determining unit determines said retransmission timeout period by a calculation based on the minimum of said round trip time, a data size of the minimum of said round trip time, the maximum of said round trip time and a data size of the maximum of said round trip time.

6. **(Original)** The wireless communication system according to claim 5, wherein said determining unit estimates an expectation communication rate of said communication line based on said data size of the minimum of said round trip time and the minimum of said round trip time, and calculates said retransmission timeout period based on said expectation communication rate and a data size of said transmission data, the maximum of said round trip time and said data size of the maximum of said round trip time.

7. **(Original)** The wireless communication system according to claim 6, further including:

a memory unit which stores a monitoring history of said round trip time and said data size, wherein said determining unit uses said data size of the minimum of said round trip time and the minimum of said round trip time stored in said memory unit for estimating said expectation communication rate.

8. **(Original)** The wireless communication system according to claim 7, wherein said determining unit estimates a maximum variation delay time of said communication line based on said data size of the maximum of said round trip time, the maximum of said round trip time and said expectation communication rate, and calculates said retransmission timeout period based

on said expectation communication rate, said maximum variation delay time and said data size of said transmission data.

9. (Currently Amended) The wireless communication system according to claim 4, further including:

a storage unit which associates a usage situation of said communication line with an expectation communication rate of said communication line and a maximum variation delay time of said communication line, and stores them,

wherein said determining unit obtains said usage situation of said communication line, and calculates said retransmission timeout period based on said data size of said transmission data, said usage situation, said expectation communication rate and said maximum variation delay time, and

said expectation communication rate and said maximum variation delay time are obtained from said storage unit based on said usage situation.

10. (Original) The wireless communication system according to claim 9, wherein said usage situation is one of a traffic condition of said communication line, a channel quality of said communication line and a time zone of a time of transmitting said transmission data.

11. (Currently Amended) An information processing apparatus used for a wireless communication, comprising:

a transmitting unit ~~which transmits a~~ operable to transmit transmission data and ~~receives an to receive~~ acknowledgement data corresponding to said transmission data through a communication line;

a monitoring unit ~~which monitors~~ operable to monitor said transmission data and said acknowledgement data; and

a determining unit ~~which determines~~ operable to determine a retransmission timeout period based on a monitored result by said monitoring unit ~~in within~~ a certain period;

wherein said transmitting unit retransmits said transmission data when said acknowledgement data is not received in said retransmission timeout period,

wherein said monitoring unit is operable to monitor a round trip time and a data size (Dmin, Dmax, Dsize) of said transmission data, the round trip time being a time difference between a transmission time of the transmission data and a reception time of the acknowledgment data.

12. (Currently Amended) The information processing apparatus according to claim 11, wherein said communication line includes a wireless communication line and ~~a~~ the wire communication line.

13. (Original) The information processing apparatus according to claim 12, wherein said determining unit determines said retransmission timeout period based on said monitored result in a most recent certain period.

14. (Canceled)

15. (Currently Amended) The information processing apparatus according to claim ~~14~~ 11, wherein said determining unit determines said retransmission timeout period by a calculation based on the minimum of said round trip time, a data size of the minimum of said round trip time, the maximum of said round trip time and a data size of the maximum of said round trip time.

16. (Original) The information processing apparatus according to claim 11, wherein said determining unit estimates an expectation communication rate of said communication line based on said data size of the minimum of said round trip time and the minimum of said round trip time, and calculates said retransmission timeout period based on said expectation communication rate and a data size of said transmission data, the maximum of said round trip time and said data size of the maximum of said round trip time.

17. (Original) The information processing apparatus according to claim 16, further comprising:

a memory unit which stores a monitoring history of said round trip time and said data size, wherein said determining unit uses said data size of the minimum of said round trip time and the minimum of said round trip time stored in said memory unit for estimating said expectation communication rate.

18. (Original) The information processing apparatus according to claim 17, wherein said determining unit estimates a maximum variation delay time of said communication line based on said data size of the maximum of said round trip time, the maximum of said round trip time and said expectation communication rate, and calculates said retransmission timeout period based on said expectation communication rate, said maximum variation delay time and said data size of said transmission data.

19. (Currently Amended) The information processing apparatus according to claim ~~14~~ 11, further comprising:

a storage unit which associates a usage situation of said communication line with an expectation communication rate of said communication line and a maximum variation delay time of said communication line, and stores them,

wherein said determining unit obtains said usage situation of said communication line, and calculates said retransmission timeout period based on said data size of said transmission data, said usage situation, said expectation communication rate and said maximum variation delay time, and

said expectation communication rate and said maximum variation delay time are obtained from said storage unit based on said usage situation.

20. (Original) The information processing apparatus according to claim 19, wherein said usage situation is one of a traffic condition of said communication line, a channel quality of

said communication line and a time zone of a time of transmitting said transmission data.

21. (Currently Amended) A mobile terminal used for a wireless communication, comprising:

a transmitting unit ~~which transmits a~~ operable to transmit transmission data and ~~receives an to receive~~ acknowledgement data corresponding to said transmission data through a communication line;

a monitoring unit ~~which monitors~~ operable to monitor said transmission data and said acknowledgement data; and

a determining unit ~~which determines~~ operable to monitor a retransmission timeout period based on a monitored result by said monitoring unit in a certain period;

wherein said transmitting unit ~~retransmits~~ is operable to retransmit said transmission data when said acknowledgement data is not received ~~in~~ within said retransmission timeout period,

wherein said monitoring unit is operable to monitor a round trip time and a data size (Dmin, Dmax, Dsize) of said transmission data, the round trip time being a time difference between a transmission time of the transmission data and a reception time of the acknowledgment data.

22. (Currently Amended) The mobile terminal according to claim 21, wherein said communication line includes a wireless communication line and ~~a~~ the a wire communication line.

23. (Original) The mobile terminal according to claim 22, wherein said determining unit determines said retransmission timeout period based on said monitored result in a most recent certain period.

24. (Canceled)

25. (Currently Amended) The mobile terminal according to claim ~~24~~ 21, wherein said determining unit determines said retransmission timeout period by a calculation based on the

minimum of said round trip time, a data size of the minimum of said round trip time, the maximum of said round trip time and a data size of the maximum of said round trip time.

26. (Original) The mobile terminal according to claim 25 21, wherein said determining unit estimates an expectation communication rate of said communication line based on said data size of the minimum of said round trip time and the minimum of said round trip time, and calculates said retransmission timeout period based on said expectation communication rate and a data size of said transmission data, the maximum of said round trip time and said data size of the maximum of said round trip time.

27. (Original) The mobile terminal according to claim 26, further comprising:
a memory unit which stores a monitoring history of said round trip time and said data size, wherein said determining unit uses said data size of the minimum of said round trip time and the minimum of said round trip time stored in said memory unit for estimating said expectation communication rate.

28. (Original) The mobile terminal according to claim 27, wherein said determining unit estimates a maximum variation delay time of said communication line based on said data size of the maximum of said round trip time, the maximum of said round trip time and said expectation communication rate, and calculates said retransmission timeout period based on said expectation communication rate, said maximum variation delay time and said data size of said transmission data.

29. (Currently Amended) The mobile terminal according to claim 24 21, further comprising:

a storage unit which associates a usage situation of said communication line with an expectation communication rate of said communication line and a maximum variation delay time of said communication line, and stores them,

wherein said determining unit obtains said usage situation of said communication line, and

calculates said retransmission timeout period based on said data size of said transmission data, said usage situation, said expectation communication rate and said maximum variation delay time, and

said expectation communication rate and said maximum variation delay time are obtained from said storage unit based on said usage situation.

30. (Original) The mobile terminal according to claim 29, wherein said usage situation is one of a traffic condition of said communication line, a channel quality of said communication line and a time zone of a time of transmitting said transmission data.

31. (Currently Amended) A determination method of a retransmission timeout period, comprising:

transmitting a transmission data and receiving an acknowledgement data which corresponds to said transmission data through a communication line;

monitoring said transmission data and said acknowledgement data; and

determining a retransmission timeout period based on a monitored result in a certain period;

wherein said transmission data is retransmitted when said acknowledgement data is not received in within said retransmission timeout period,

wherein is said monitoring the transmission data and the acknowledgement data, a round trip time and a data size (Dmin, Dmax, Dsize) of said transmission data are monitored, the round trip time being a time difference between a transmission time of the transmission data and a reception time of the acknowledgement data.

32. (Original) The determination method according to claim 31, wherein said communication line includes a wireless communication line and a wire communication line.

33. (Original) The determination method according to claim 32, wherein said determining step includes:

determining said retransmission timeout period based on said monitored result in a most recent certain period.

34. (Canceled)

35. (Currently Amended) The determination method according to claim ~~34~~ 31, wherein said determining step includes:

determining said retransmission timeout period by a calculation based on the minimum of said round trip time, a data size of the minimum of said round trip time, the maximum of said round trip time and a data size of the maximum of said round trip time.

36. (Original) The determination method according to claim 35, wherein said determining step includes:

estimating an expectation communication rate of said communication line based on said data size of the minimum of said round trip time and the minimum of said round trip time, and

calculating said retransmission timeout period based on said expectation communication rate and a data size of said transmission data, the maximum of said round trip time and said data size of the maximum of said round trip time.

37. (Original) The determination method according to claim 36, further comprising:

storing a monitoring history of said round trip time and said data size,

wherein in said estimating step, said data size of the minimum of said round trip time and the minimum of said round trip time stored in said memory unit are used for estimating said expectation communication rate.

38. (Original) The determination method according to claim 37, wherein said calculating step includes:

estimating a maximum variation delay time of said communication line based on said data size of the maximum of said round trip time, the maximum of said round trip time and said expectation communication rate, and

calculating said retransmission timeout period based on said expectation communication rate, said maximum variation delay time and said data size of said transmission data.

39. (Currently Amended) The determination method according to claim ~~34~~31, further comprising:

associating a usage situation of said communication line with an expectation communication rate of said communication line and a maximum variation delay time of said communication line,

storing said usage situation, said expectation communication rate and said maximum variation delay time,

obtaining said usage situation of said communication line, and

calculating said retransmission timeout period based on said data size of said transmission data, said usage situation, said expectation communication rate and said maximum variation delay time,

wherein said expectation communication rate and said maximum variation delay time are obtained from said storage unit based on said usage situation.

40. (Original) The determination method according to claim 39, wherein said usage situation is one of a traffic condition of said communication line, a channel quality of said communication line and a time zone of a time of transmitting said transmission data.

41. (Currently Amended) A computer-readable medium incorporating a computer program product embodied on a computer-readable medium and comprising code operable to control that, when executed, causes a computer to perform the following, the code comprising:

instructions to transmit ~~transmitting~~ a transmission data and receiving an acknowledgement data which corresponds to said transmission data through a communication line;

instructions to monitor ~~monitoring~~ said transmission data and said acknowledgement data; and

instructions to determine ~~determining~~ a retransmission timeout period based on a monitored result in a certain period;

wherein said transmission data is retransmitted when said acknowledgement data is not received in within said retransmission timeout period,

wherein said instructions to monitoring the transmission data and the acknowledgement data include instructions to monitor a round trip time and a data size (Dmin, Dmax, Dsize) of said transmission data, the round trip time being a time difference between a transmission time of the transmission data and a reception time of the acknowledgment data.

42. (Original) The computer program product according to claim 41, wherein said communication line includes a wireless communication line and a wire communication line.

43. (Currently Amended) The computer program product according to claim 42, wherein said determining step includes:

determining said retransmission timeout period based on said monitored result in a the most recent certain period.

44. (Canceled)

45. (Currently Amended) The computer program product according to claim ~~44~~ 41, wherein said determining step includes:

determining said retransmission timeout period by a calculation based on the minimum of said round trip time, a data size of the minimum of said round trip time, the maximum of said round trip time and a data size of the maximum of said round trip time.

46. (Original) The computer program product according to claim 45, wherein said determining step includes:

estimating an expectation communication rate of said communication line based on said data size of the minimum of said round trip time and the minimum of said round trip time, and
calculating said retransmission timeout period based on said expectation communication rate and a data size of said transmission data, the maximum of said round trip time and said data size of the maximum of said round trip time.

47. (Original) The computer program product according to claim 46, further comprising:

storing a monitoring history of said round trip time and said data size,
wherein in said estimating step, said data size of the minimum of said round trip time and the minimum of said round trip time stored in said memory unit are used for estimating said expectation communication rate.

48. (Original) The computer program product according to claim 47, wherein said calculating step includes:

estimating a maximum variation delay time of said communication line based on said data size of the maximum of said round trip time, the maximum of said round trip time and said expectation communication rate, and

calculating said retransmission timeout period based on said expectation communication rate, said maximum variation delay time and said data size of said transmission data.

49. (Currently Amended) The computer program product according to claim ~~44~~ 41, further comprising:

associating a usage situation of said communication line with an expectation communication rate of said communication line and a maximum variation delay time of said communication line,

storing said usage situation, said expectation communication rate and said maximum

variation delay time,

obtaining said usage situation of said communication line, and

calculating said retransmission timeout period based on said data size of said transmission data, said usage situation, said expectation communication rate and said maximum variation delay time,

wherein said expectation communication rate and said maximum variation delay time are obtained from said storage unit based on said usage situation.

50. (Original) The computer program product according to claim 49, wherein said usage situation is one of a traffic condition of said communication line, a channel quality of said communication line and a time zone of a time of transmitting said transmission data.